

EARLY DIAGNOSIS AND FOLLOW UP OF TWIN-PREGNANCY USING A TWO-DIMENSIONAL ULTRASONIC SCANNER

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A two-dimensional ultrasonic B scanner is used to diagnose both single and multiple early pregnancy. The contact scanning method is used. The patient is required to have a full bladder if she is under 14 weeks gestation. The uterus and the cervix are outlined. Then a search is made for the gestation sac or sacs within the uterine cavity if the cyesis is under 10 weeks. Serial longitudinal and transverse scans are carried out to outline the gestation sacs. The fetal echoes within the gestation sac are seen and the fetal heart rate can be detected using the time-position display (TP). The patients that are studied fall into the following groups: (1) patients who are clinically suspected to have multiple pregnancy; (2) patients who have been on ovulation induction therapy; (3) patients with family history of twins; (4) patients with threatened abortion. The diagnosis of multiple pregnancy during the 11th week is equivocal. After the 12th week gestation the diagnosis is made by visualising the fetal head and the maturity is then estimated by measuring the biparietal diameter. Thus fetal growth can be assessed by carrying out serial biparietal diameter estimations.

Twin pregnancies are exceedingly high-risk pregnancies as agreed by most authorities. The main complications in these pregnancies are premature delivery, low birth weight and complications of delivery especially with the second twin (Donald 1969, Wallace 1970). Thus the perinatal mortality rate of twin pregnancies is three to four times that for singleton pregnancies or even higher, especially in undiagnosed twins or those diagnosed late in the pregnancy (Robertson 1964).

The early diagnosis of twin pregnancy would therefore be of value both for the antenatal management of these pregnancies and the appropriate care in labour and at the time of delivery (Powers 1973).

Careful clinical examination might suggest multiple pregnancy which will be confirmed by techniques such as X-ray, electrocardiography and ultrasonography.

We find ultrasound as a method of diagnosing single or multiple pregnancy especially in the first and second trimesters both safe and reliable (Donald and Abdulla 1967, Abdulla 1971, Abdulla et al. 1971). The gestation sac is clearly demonstrated from the sixth week of amenorrhoea and sometimes even earlier. It is not only possible to see the gestation sac but also the level of its nidation within the uterine cavity and to follow its subsequent growth.

The equipment we use is the Disonograph NE 4102 (Nuclear Enterprises). Using a frequency of 2½ MHz gives the optimum penetration and resolution for this application. The contact scanning method is employed using olive oil for acoustic coupling. If the patient is under 14 weeks gestation she should have a full bladder and this is achieved by asking her to drink fluids until she feels her bladder full. A full bladder makes it possible to visualise the uterus easily by acting as a transmission tank in front of the uterus and by displacing the bowel. The gestation sac or sacs are localised by carrying out serial longitudinal scans, shifting the plane of the scan to the left and right of the midline. The gestation sac is seen as a sharp, clear and complete ring within the uterine cavity. The earliest singleton we have seen was at 34 days' amenorrhoea (Abdulla 1971). The earliest twin pregnancy which we have diagnosed was at six weeks' amenorrhoea when a double ring was seen within the uterine cavity (Fig. 1). From the sixth week onward a small fetal echo can be seen within each gestation sac



Fig. 1. An ultrasonogram of a twin pregnancy at 6 weeks' amenorrhoea. The gestation sacs are seen as two white rings (arrows). Full bladder B. Longitudinal section cranial wards to left.

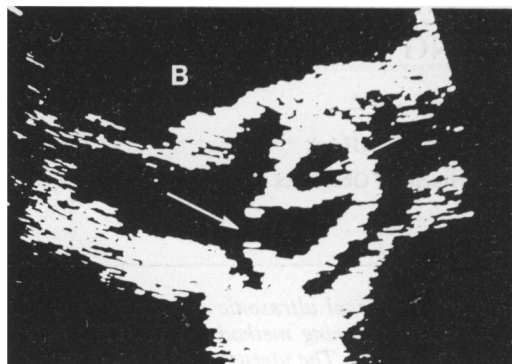


Fig. 2. A transverse section of a twin pregnancy at 6 weeks and four days amenorrhoea. The top arrow indicates the fetal echo within the upper gestation sac. The second gestation sac is marked by lower arrow. Bladder cavity B.

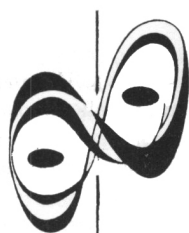


Fig. 3. The symbol of the Congress.

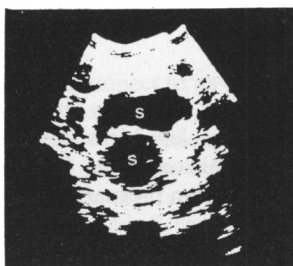


Fig. 4. A transverse section of a twin pregnancy at 10 weeks' amenorrhoea. The gestation sacs (S inside each sac) fill up the whole uterine cavity.

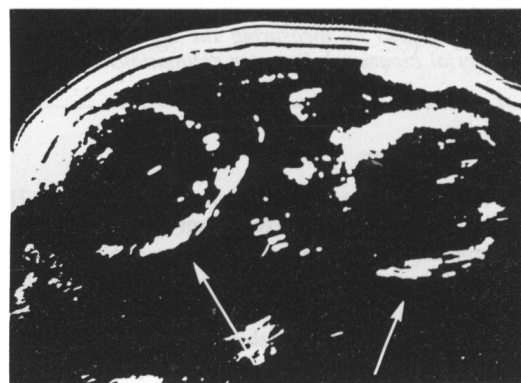


Fig. 5. Twin pregnancy at 28 weeks amenorrhoea. A transverse section showing the two fetal heads (arrows). Both twins are presenting as breech.

(Fig. 2). One can also demonstrate the fetal heart at this stage by using the time position display (Robinson 1972).

I am sure all of you will recognise my next slide, which depicts two gestation sacs at eight weeks' amenorrhoea and the fetal echos within them (Fig. 3). Perhaps at this stage then it would be appropriate to thank the organisers of the Congress for choosing a twin ultrasonogram as the symbol for this Congress.

The gestation sacs will develop and increase in size so that by the ninth week they occupy more than two-thirds of the uterine cavity and at the tenth week they will fill the whole uterine cavity (Fig. 4). Between the eleventh and twelfth week the picture is not so clear for the echos from the gestation sacs appear to break up probably due to the differentiation of the chorion frondosum and chorion levi and also there are more fetal echos to be seen. Robinson has shown that during the first trimester

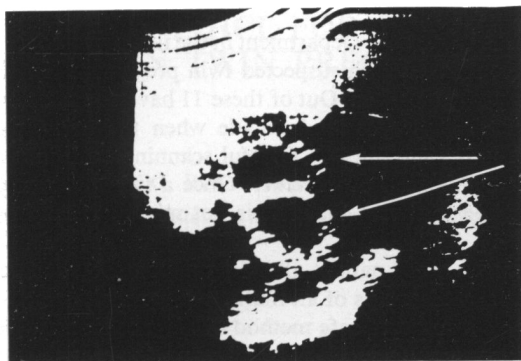


Fig. 6a. A triplet pregnancy at 7 weeks amenorrhea. Two gestation sacs (arrows) are seen. Longitudinal section.

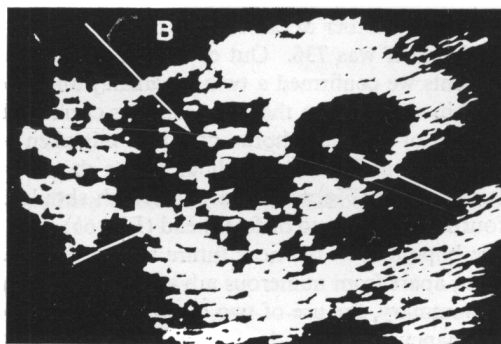


Fig. 6b. Same case as in 6a. With careful scanning the three gestation sacs are seen (arrows). Fetal echoes are seen in two of the sacs. Transverse section. Full bladder B.

the fetal crown-rump measurement can predict the maturity of the pregnancy to within 3 days (Robinson 1973).

In most cases like in singleton pregnancies the gestation sacs appear in the upper uterine pole suggesting high implantation. This position is the most favourable, whereas when the gestation sac is at the lower pole of the uterus abortion has always followed and probably what we are seeing is the actual abortion process.

Where there is no growth in any of the gestation sacs a blighted ovum is predicted and one can even see this sac shrinking on further examination. It is also useful to identify the fetal echo within the gestation sac and record the fetal heart. This, I am sure, is very reassuring for every expectant mother especially those with threatened abortion.

In patients who are large for dates the diagnosis of hydatidiform mole during the first two trimesters is readily achieved by seeing the characteristic speckled echo pattern (Donald and Abdulla 1967).

From the thirteenth week onward one can not only see the fetal echos but can see the fetal head with the midline. The biparietal diameter therefore can be measured and the growth of the fetal heads can be followed by carrying out serial biparietal diameter measurements (Fig. 5). Serial cephalometry is a reliable method of assessing the maturity and the growth of the fetal head (Campbell and Newman 1971). It is important to carry out serial cephalometry in cases with previous history of fetal abnormality or small-for-dates babies. Also in cases where the pregnancy is complicated by hypertension, pre-eclampsia, antepartum hemorrhage, etc. Towards the end of the pregnancy it is useful to measure the biparietal diameter, especially if one or both of the twins are presenting as breech, for one can make sure that there is no question of disproportion by comparing the biparietal diameter with X-ray pelvic measurements. It is also reassuring if the second twin presents as a breech and has a biparietal diameter not larger than the first which presents as cephalic.

The patients referred to the Ultrasonic Department in whom multiple pregnancy was diagnosed fell into one of the following groups:

1. Patients who are large for dates at their first antenatal visit which is usually about the end of the first trimester or the beginning of the second trimester;
2. Patients in whom multiple pregnancy was suspected sometime during the antenatal period;
3. Patients with strong family history of twins, or who previously had twins;
4. Patients with threatened abortion;
5. Patients who have been referred for ultrasonography for reasons other than multiple pregnancy and in whom twins were then diagnosed;

6. Patients who have been on ovulation induction therapy.

The total number of patients that were examined in the Ultrasonic Department in the first eight months of this year was 736. Out of these 152 patients were referred with suspected twin pregnancy. In 18 patients we confirmed a twin pregnancy and in one patient triplets. Out of these 11 have so far delivered in all of whom the diagnosis was correct. However, mistakes can be made when the transverse section of the fetal thorax could be mistaken for another fetal head. Careful scanning both in the transverse and the longitudinal planes should prevent this kind of mistake. Once a twin pregnancy is diagnosed (Fig. 6a), a careful search should be made to ensure that one is not missing a third or fourth gestation sac or fetal head (Fig. 6b).

We hope that in the near future we will be able to scan every patient attending the antenatal clinic. This, apart from numerous advantages, ensures the early diagnosis of all multiple pregnancies.

In summary, the use of two dimensional ultrasound is a sure and safe method of diagnosing multiple pregnancy especially during the first and second trimesters. One can also follow-up the growth rate of both the gestation sac during the first trimester and the biparietal diameter during the second and third trimesters. It is also desirable in early pregnancy to avoid possible hazards from X-ray radiation. Gone are the days when the crystal ball gazing technique was used. It is now hoped that early diagnosis of multiple pregnancy can help in reducing the perinatal mortality in these patients. This can be achieved prevention of complications when patients can have the benefit of, for example, bed rest, cervical suture, and more important, well-planned delivery of the twins.

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